

Abstract Submitted
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Shock Initiation Thresholds for Projectiles with Curved Surfaces

HUGH JAMES, NICHOLAS WHITWORTH, AWE — The impacts of flat-nosed rods into bare, conventional high explosives tend to produce either detonations or very little discernable reaction. In contrast impacts from projectiles with curved striking surfaces can produce a range of reactions, some very vigorous, as well as detonations. This paper attempts to explain this complex behaviour. The identification of the initiation threshold as corresponding to the boundary of a particular set of responses, rather than just the boundary between no reaction and detonation, is discussed in the light of experimental results. The structure of the impact shock is explored and the existence of two sonic boundaries is explained. The linkage between the theoretical initiation threshold and one of the sonic boundaries is obtained by comparing the generation of the boundary to the experimentally determined presence of the threshold. The implications of this threshold, in terms of the proportion of the diameter of the projectile needed to cause initiation, are discussed and the results illustrated using CREST, a hydrocode-based reactive burn explosive model.

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